

REMARKS

In response to the Interview Summary mailed November 3, 2003, and the Office Action mailed July 15, 2003, Applicants thank Examiners Maldonado and Foursone for the telephonic Interview of October 22, 2003, where the Examiners discussed and clarified the outstanding rejections as referred to in the Interview Summary Form completed by the Examiners.

Claims 10-23 were renumbered as claims 32-45 to obviate Examiner's objection. The claims were amended directly or indirectly to exclude sugars and sugar alcohols from the claimed composition and are supported, for example, at paragraph [0012], [0014] and [0015].¹ Claim 2 was amended to add the term "comprises", which was inadvertently omitted in the original claim. Claims 46-49 are new and recite the organic solvent as a Markush group, which is supported, for example, at paragraphs [0051] and [0120]. Therefore, claims 1-9 and 32-49 will be pending after entry of this Amendment. The following discussion addresses the Examiner's comments and rejection raised in the Office Action mailed July 15, 2003.

Objections to the Claims

The claims were objected to as not being in accordance with 37 C.F.R. 1.126, which requires the original numbering of the claims to be preserved throughout the prosecution. Claims 10-23 were renumbered to claims 32-45 to obviate the objection. The status of canceled claims 10-31 has also been added.

The 35 U.S.C. § 102(b) Rejection

Claims 1-6 and 8 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,846,695 ("Iwata"). Applicants respectfully traverse the rejection.

The standard for anticipation under 35 U.S.C. § 102 is strict identity. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

¹ References are made to Published U.S. Patent Application No. US 2002/0134963 A1.

Negative limitations are acceptable as long as there is a basis for the limitation in the disclosure. The disclosure does not have to describe the limitation exactly but, rather, only to the extent that a person of ordinary skill in the art would recognize that the inventor had possession of the invention as of the filing date. *See In re Wertheim*, 541 F.2d 257, 262 (CCPA 1976). Declarations can be used to prove that one of skill in the art would recognize that the inventor had possession of the invention as of the filing date despite lack of a literal basis of support for the limitation. *See Ex Parte Parks*, 30 USPQ 1234, 1236-1237 (BPAI 1993).

Amended claim 1 recites a composition for removal of etch residues from integrated circuits using copper materials, which comprises a choline compound, water and an organic solvent, wherein the composition does not contain a sugar or a sugar alcohol.

Iwata does not teach each and every limitation of claim 1. Iwata teaches a composition comprising 0.01-20% by weight of a quaternary ammonium hydroxide, 1-80% of a nucleophilic amine, 0.5-20% by weight of a sugar and/or a sugar alcohol, with the remainder of the composition comprising water. Iwata does not teach a composition that does not contain a sugar or a sugar alcohol.

Iwata does not have written description support for the compositions of the present invention. Iwata teaches away from the present invention by teaching away from the use of a cleaning composition that does not contain a sugar or sugar alcohol. Iwata teaches at column 4, lines 25-28, that "when the concentration of the sugar or sugar alcohol is lower than the specified range, corrosion of the wiring material in the circuit cannot sufficiently be prevented." As such, the teaching in Iwata *requires* that the composition contain a sugar or sugar alcohol. Since the addition of sugar or sugar alcohol is essential to the Iwata composition, Iwata does not contain proper written description under 35 U.S.C. § 112, paragraph 1, for a composition that does not contain a sugar or a sugar alcohol. *See Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479 (Fed. Cir. 1998).

The specification in the present invention teaches away from using the Iwata composition and, since it is evident from the specification that the inventors were in possession of a composition that does not contain a sugar or sugar alcohol, the claims of the present invention have been amended to expressly recite sugar and sugar alcohol free

compositions. First, the inventors taught that Iwata is prior art, and that the prior art is not suitable for cleaning etch residue from copper layer. Second, the inventors teach that choline compounds and organic solvents can be used together in a composition without further teaching or suggesting the use of a sugar or a sugar alcohol, despite being aware of the teaching in Iwata that *requires* a sugar or a sugar alcohol. As stated in a declaration by inventor Dr. David Maloney in distinguishing Iwata, "one of skill in the art would not consider using a formulation from Iwata that did not contain a sugar or a sugar alcohol." See Declaration of David Maloney ¶ 8, attached as Exhibit 1 in a response filed March 24, 2003, for the present application. Accordingly, one of skill in the art would recognize from the disclosure that the inventor of the present invention was in possession of a composition that does not contain a sugar or a sugar alcohol.

Since Iwata does not anticipate amended claim 1 for the above reasons, Iwata does not anticipate dependent claims 2-6 and 8. Accordingly, Applicants respectfully request withdrawal of the rejection.

Although the rejection is unclear, claims 1-4 and 32-34 appear to be rejected under 35 U.S.C. §102(b) as being anticipated by Iwata. The rejection of claims 1-4 is discussed above. Applicants respectfully traverse the rejection to claims 32-34.

Claim 32 recites a composition for the removal of etch residues from integrated circuits using copper materials, in which the composition comprises from greater than 20% to 50% by weight choline, water, and an organic solvent.

Iwata does not teach each and every limitation of claim 32. Iwata teaches a composition comprising 0.01-20% by weight of a quaternary ammonium hydroxide, 1-80% of a nucleophilic amine, 0.5-20% by weight of a sugar and/or a sugar alcohol, with the remainder of the composition comprising water. Iwata does not teach a composition that comprises from greater than 20% to 50% by weight choline. Since Iwata does not anticipate claim 32, Iwata does not anticipate claims 33-34. Accordingly, Applicants request withdrawal of the rejection.

Although the rejection is unclear, claims 5, 6, 8, 35, 36 and 38 appear to be rejected under 35 U.S.C. §102(b) as being anticipated by Iwata. The rejection of claims 5, 6 and 8 are discussed above. Applicants respectfully traverse the rejection to claims 35, 36 and 38.

Claims 35, 36 and 38 depend from claim 32. Since Iwata does not anticipate claim 32, Iwata does not anticipate claims 35, 36 and 38. Accordingly, Applicants request withdrawal of the rejection.

The 35 U.S.C. § 103 Rejection

Claims 7, 9, 37 and 39-45 were rejected under 35 U.S.C. §103 as obvious over U.S. Patent No. 5,846,695 ("Iwata") in view of U.S. Patent No. 5,798,323 ("Honda"). Applicants respectfully traverse the rejection.

When rejecting claims under 35 U.S.C. § 103, the examiner bears the burden of establishing a *prima facie* case of obviousness. Three criteria are required to establish a *prima facie* case of obviousness. First, the prior art reference, or references when combined, must teach or suggest each and every limitation of the claimed invention. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine the teachings of the references in the manner suggested by the examiner. Finally, the skilled artisan, in light of the teachings of the prior art, must have a reasonable expectation that the modification or combination suggested by the examiner would be successful. Both the teaching or suggestion to make the claimed invention and the reasonable expectation of success must be found in the prior art, not in the Applicants' disclosure. If any one of these criteria is not met, *prima facie* obviousness has not been established.

Claims 7 and 9 depend from claim 1, and claim 1 is recited above.

As described above, Iwata does not teach or suggest every element of claim 1. The deficiencies of Iwata are not cured by Honda. Honda teaches a composition comprising about 5% to about 50% solvent selected from the group consisting of [select organic solvents]; about 10% to about 90% of an alkanolamine selected from the group consisting of [select alkanolamines]; about 0.1% to about 4% [select corrosion inhibitors]; and about 0.1% to about 40% water. In fact, Honda teaches away from using a composition comprising tetramethylammonium hydroxide, which is a quaternary ammonium hydroxide, to clean etch residues from a copper layer. Since the composition taught in Iwata requires a quaternary ammonium hydroxide, there no suggestion or motivation to combine the teachings of Iwata

and Honda to obtain the invention of claim 1, and even if the teachings were combined, the combination would not teach the composition of claim 1, which does not contain a sugar or a sugar alcohol.

Since claim 1 is not obvious over Iwata in view of Honda for the above reasons, dependent claims 7 and 9 are not obvious over Iwata in view of Honda. Accordingly, Applicants request withdrawal of the rejection.

Claims 37 and 39 depend from claim 32, and claim 32 is recited above.

Iwata does not teach or suggest every element of claim 32. As described above, Iwata teaches a composition comprising 0.01-20% by weight of a quaternary ammonium hydroxide. Iwata does not teach a composition that comprises from greater than 20% to 50% by weight choline.

The deficiencies of Iwata are not cured by Honda. The choline recited in claim 32 of the present invention is a quaternary ammonium hydroxide. As described above, Honda teaches away from using a composition comprising tetramethylammonium hydroxide, which is a quaternary ammonium hydroxide, to clean etch residues from a copper layer. Since the composition taught in Iwata requires a quaternary ammonium hydroxide, not only does the combination of Iwata and Honda fail to teach or suggest each and every limitation of claim 32, but there is neither a suggestion or motivation to combine the references nor a reasonable expectation that such a combination would produce a composition for successfully cleaning etch residue from a copper layer.

Since claim 32 is not obvious over Iwata in view of Honda for the above reasons, dependent claims 37 and 39 are not obvious over Iwata in view of Honda. Accordingly, Applicants request withdrawal of the rejection.

Claims 41-45 depend from claim 40. Claim 40 has been amended to recite a composition for the removal of etch residues from integrated circuits using copper materials, in which the composition comprises from about 10% by weight choline to about 50% by weight choline; water; and a glycol selected from the group consisting of ethylene glycol, ethylene glycol alkyl ether, diethylene glycol alkyl ether, triethylene glycol alkyl ether,

propylene glycol, and propylene glycol alkyl ether; wherein said composition does not contain a sugar or a sugar alcohol.

Iwata does not teach or suggest every element of claim 40. Generally, claim 40 recites a composition comprising choline, water and a glycol, wherein the composition does not contain a sugar or a sugar alcohol. Iwata generally teaches a composition comprising a quaternary ammonium hydroxide, a nucleophilic amine, a sugar or a sugar alcohol and water. As described above, Iwata does not teach or suggest a composition that does not contain a sugar or a sugar alcohol, and Honda does not cure this deficiency. In addition, Honda does not teach or suggest that the nucleophilic amine component of Iwata can be replaced with a glycol. Furthermore, the choline recited in claim 40 of the present invention is a quaternary ammonium hydroxide. As described above, Honda teaches away from using a composition comprising tetramethylammonium hydroxide, which is a quaternary ammonium hydroxide, to clean etch residues from a copper layer. Since the composition taught in Iwata requires a quaternary ammonium hydroxide, not only does the combination of Iwata and Honda fail to teach or suggest each and every limitation of claim 40, but there is neither a suggestion or motivation to combine the references nor a reasonable expectation that such a combination would produce a composition for successfully cleaning etch residue from a copper layer.

Since claim 40 is not obvious over Iwata in view of Honda for the above reasons, dependent claims 41-45 are not obvious over Iwata in view of Honda. Accordingly, Applicants request withdrawal of the rejection.

CONCLUSION

Applicants respectfully request that the above-made amendments and remarks be entered and made of record in the file history of the present application. Claims 1-20 fully meet all statutory requirements for patentability. Withdrawal of the Examiner's rejections, allowance and action for issuance are respectfully requested.

Applicants thus submit that the entire application is now in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree with the Applicants' position, then a personal or telephonic interview is respectfully requested to discuss any remaining issues and expedite the eventual allowance of the application.

Applicants respectfully request that the Examiner call James S. McDonald at 650-849-7631 if any questions or issues remain.

A fee of \$158 is believed due for the claim changes of this amendment, an Amendment Fee Transmittal sheet is included herewith in duplicate. Should any additional fees be required, however, please charge such fees to Pennie & Edmonds LLP Deposit Account No. 16-1150.

Respectfully submitted,

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